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**THE**  
**HUNTERIAN ORATION**

**FEB. 13, 1877**

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THE  
HUNTERIAN ORATION

DELIVERED IN THE PRESENCE OF

His Royal Highness the Prince of Wales

AT THE

ROYAL COLLEGE OF SURGEONS OF ENGLAND

ON THE 13TH OF FEBRUARY 1877

By SIR JAMES PAGET, BART.

F.R.S., D.C.L. OXON., LL.D. CANTAB.

SERJEANT-SURGEON TO THE QUEEN

SURGEON TO THE PRINCE OF WALES

CONSULTING SURGEON TO SAINT BARTHOLOMEW'S HOSPITAL



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1877

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THE  
HUNTERIAN ORATION.

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MAY it please your ROYAL HIGHNESS :

MR. PRESIDENT, MY LORDS, AND GENTLEMEN,—

I do not doubt that I may offer to your Royal Highness the thanks of the whole College of Surgeons for your presence here to-day. By thus honouring the memory of John Hunter, you make us more than ever proud of being the guardians of his great museum and his reputation ; you make us more than ever anxious for the promotion of that true scientific surgery of which we reverence him as the founder. Moreover, we shall venture to regard your Royal Highness's presence as a sign of your approval of the efforts of the College for the public welfare, and of your desire to encourage the sciences on the cultivation of which its reputation and utility depend. For these, and many more unspoken reasons, the College, fully represented here to-day, offers to your Royal Highness its grateful and respectful thanks.

When time and the favour of my colleagues in the Council brought to me the occasion of delivering the

Hunterian oration, I thought it right to study afresh the character of John Hunter. And now I beg your leave to tell some of the facts and thoughts to which, in my study, I have been led—chiefly to tell, if I can, what were the motives of John Hunter in his scientific life ; what were the chief characters and what the method of his work ; to tell, also, some of his achievements, and of the lessons that may be read in the story of his life.

I hope that I may thus fulfil, however imperfectly, the design of the founders of the oration, by promoting the honour of John Hunter and, perhaps, even the progress of surgery, by showing, in his illustrious example, the good influence of the scientific mind.

The motive which first urged John Hunter towards the pursuit of science seems to have been only the necessity of earning his livelihood. For we find him, at first, as the youngest child of a Scotch laird, idle and negligent of education. In the first twenty years of his life he appears to have had no inclination to science or to the arts that minister to it, or, indeed, to any kind of intellectual pursuit. We find no tales of early enterprise, no childish love of nature, no sign of future mental power. When he was seventeen, he tried to help a brother-in-law, who was a bankrupt cabinet-maker in Glasgow ; and, probably, if he had succeeded, cabinet-making might have been the business of his life. Happily, he failed ; his brother-in-law was past helping. Then, after two years more of idleness, what was to be done ?

His brother William Hunter, ten years older than himself, was prosperous in London, and was becoming

distinguished as a teacher of anatomy and surgery ; so he offered to assist him, and if this should fail he would go into the army. Thus, in mere idleness or necessity, with no other reason than that there seemed nothing else to be done, John Hunter drifted into the opportunity of scientific study—drifted into the career in which he was to become great among the greatest men of science, and among all surgeons of all times the most renowned.<sup>1</sup>

It seems strange that a mind so remarkable as John Hunter's, so robust and self-willed as it proved, should not have shown or felt its power till, as if by chance, it was brought to scientific work. He had not lived in darkness or among dull people : his father was a shrewd and sensible man ; his mother well educated ; his two brothers were persons of remarkable mental power.<sup>2</sup> With these, his mind had had opportunities of exercise and culture ; but he had neglected them as to him useless. He had lived among the same wonders of the organic world, the same truths and utilities in nature as moved him, in his later years, to restless study ; yet he seems to have given no heed to them. No desire of knowledge was stirred in him till he was under the influence of scientific minds.

It may be that his mind only now began to attain the maturity requisite for a desire of scientific knowledge. But I think it was rather that now, for the first time, he found, in the company of his brother, the subjects and the method of work for which alone his mind was naturally fitted.

In 1748, when John Hunter came to London, there

<sup>1</sup> See Note A.

<sup>2</sup> See Note B.

was great intellectual activity in all the medical sciences, and William Hunter was in the midst of it. He was an intimate associate with some of the best minds of the day; he was the best lecturer and best anatomical teacher of that time; fluent, well-read, devoted to science and art, an earnest observer, an enthusiastic collector, willing to spend all that he could earn on his museum and his means of teaching. William Hunter, indeed, may be counted as the first great teacher of anatomy in England, the founder of the first great school, and among the biologists of his time and country second to none but his brother.

To be taken from idleness on a Scotch farm to an activity of life, such as John Hunter found in his brother's school, was like being born into a new world; and this was the very world, if not the only world, in which the best part of his mind could live and grow. He had a natural fitness for the study of living things; for other things he seems to have had no more desire or capacity of knowledge than common men have. The germ of this fitness was, we may believe, born in him, as in both his brothers; and when, at length, it found appropriate conditions of its life, it developed and grew into true grandeur. But this natural fitness was wholly intellectual; there was, at first, no love or desire in it; and so his mind had no motive power till it was set to its right work, and in right working found happiness.

For the happiness of intellect is in its work; that of the highest intellect in vigorous self-guided work. The highest intellect finds that happiness, the desire of which is its energising motive, not in the mere reception,

nor wholly in the possession of knowledge, but in the process of acquiring it and of using it in thoughtful exercise.

Moreover, to some intellects, and among them many of those by which the greatest results in science have been attained, there is but one kind of knowledge which satisfies either in the getting or in the having. To John Hunter there seems to have been no great intellectual happiness except in the study of living nature; and to this he was now first brought. Hence onward there was no lack of motives. The mind that had been idle, heedless, and aimless had come to its right field of action; every form of intellectual exercise and pleasure was offered to it, and it grew to capacity for all. Gradually the desire of knowledge, both for its own sake and for the happiness of gaining it and using it, became like an insatiable passion, a motive to incessant work.

Now, I believe that in Hunter may be studied an example of the influence of the simplest and most natural motive of the scientific life; namely, the intense desire for the happiness of knowledge and of intellectual exercise in watching and working for the truth. It is not mere curiosity. Curiosity is, indeed, a necessary part of scientific desire; but it is not the common curiosity which can be satisfied by hearsay; which seeks only new things, careless whether they be true if only they be wonderful or personal, or whether, if true, they can be wrought into real or useful knowledge. Hunter is a type of the true men of science, in that he was always impelled by desire to attain knowledge by intellectual self-exertion. And, like an athlete, restless unless in the exercise of his strength, so he could not rest; he could not but search,

and watch, and question Nature ; he must compel her to answer, and then compare and interpret her answers and penetrate to their inmost meanings. And he could set no limit to his search. Within the range of the great world of life he must needs seek, by every method of enquiry, every kind and degree of knowledge.

With this passion for knowledge of biology another concurred. Hunter had a passion for collecting. It may have come through imitation of his brother ; it may have been a mere yielding to the fashion of the time, as dominant then as it is now ; but I believe it was natural—an instinctive love of gathering and keeping ; and it was vehement in him, and worked together with his desire of knowledge, each animating and provoking the other.

It cannot be maintained that Hunter's love of collecting was only consequent on his desire of knowledge. Science determined its first direction ; and the great desire of his life was to have a grand museum, with ample and costly illustrations in catalogues and drawings. He would have collected, if he could, everything that could show to himself and others all the great facts in biology that he could find. But even this could not satisfy his love of collecting ; for, besides his museum, he collected a crowd of things that must have been useless even to himself, and must have helped to make him poor ; pictures of much cost, engravings, armour, works of art in ivory, bronze, marble, stuffed birds, and implements of savage warfare. With all these his house in Earl's Court must have looked like a curiosity-shop.<sup>1</sup> But if this were a fault it may easily be pardoned ; no earnest collector ever binds

<sup>1</sup> See Note C.

himself within the limits of science, utility, or prudence. And if one would justify an extravagant love of collecting, silly as it often is, the example of Hunter might be urged. It led him to constantly larger ranges of enquiry; it was among the motives of his widest and deepest studies, and it incited the industry and skill with which he gathered the great stores of facts which are treasured in this College. A century of study has not exhausted all the truths that are contained in his collections; and gathered round them, as if by the attraction of a central force, is the museum of the College, now more than twice as large as the Hunterian, and forming with it the very thing that Hunter longed for—the best anatomical museum in the world; the most perfect in order and condition; the largest treasury of visible biological facts.

One more motive of Hunter's scientific life must be told. He was a master in all the arts of anatomy; very skilful in dissecting, injecting, and all known methods of displaying specimens. I suspect that his first success in life was in his first dissection; and it is said that he was so fond of his art that it was among the motives which led him beyond the study of human anatomy into that of comparative anatomy, which, till his time, had hardly been studied in this country.<sup>1</sup>

These, I believe, were the special motives of Hunter's scientific life; and they deserve study, for his life was given to science as entirely and as purely as that of any man.

Doubtless we may discern in him how, sometimes, other motives added to these their various force. But

<sup>1</sup> Norris, *Hunterian Oration*, 1817, p. 49, and *Outley's Life of Hunter*, p. 7.



they were casual and wholly subordinate.<sup>1</sup> They were far outweighed by the always growing power of those motives of his life which I have described and, chiefly, by the desire of happiness in intellectual exercise. This desire increased with indulgence, with contest against difficulties, with the view of constantly new objects, and with the encouragement of success. He filled himself with knowledge, and, through knowledge, became an ardent lover of nature. I say, through knowledge: for Nature, in her manifold perfections, inspires many kinds of love; and Hunter's was almost wholly intellectual. He had none of the love that moves the poet, the idealist, or the theologian: for, in truth, neither poetry, nor idealism, nor theology ever coloured the simplicity of his scientific mind. He had the social love of nature; he was a warm-hearted man, loved dogs and horses, and sometimes writes of the living things about him as if they were companions. But his chief love was for the charms of truth that lie hidden beneath the appearances, the veils, of nature; and his love was enhanced when search revealed the utility of all he saw—the perfection of the adjustment of everything to its use; the evidence of purpose fulfilled in every change; the evidence of grandeur in a world of infinitely various forms held steadfast by few laws.

In all these he found delight and motive for fresh study; and I cannot doubt that he attained that highest achievement and satisfaction of the intellect when it can rest in a loving contemplation of the truth; loving it not only because it is right, but because it is beautiful. I

<sup>1</sup> See Note D.

cannot doubt that in the contemplation of the order and mutual fitness in a great field of scientific truth there may be, to some high intellects, a source of pure delight such as are the sensuous beauties of nature to the cultivated artist-mind, or virtue to the enlightened conscience. I believe that in contemplation such as this Hunter enjoyed a calm, pure happiness. So Reynolds, his friend, seems to tell of him. In that masterpiece of portraiture, which teaches like a chapter of biography, Hunter is not shown as the busy anatomist or experimenter pursuing objective facts; the chief records of his work are in the background; he is at rest and looking out, but as one who is looking far beyond and away from things visible into a world of truth and law which can be only intellectually discerned. The clear vision of that world was his reward. It may be the reward of all who will live the scientific life with the same devotion and simplicity.

Let me speak now of the chief characters and the method of Hunter's work, and thus try to indicate the character of his mind.

That which first and always strikes one is the vast quantity of work he did. It is told of him by one pupil that 'he rose regularly at the dawn of day, and never ceased from his labours till the night was far advanced;' by others, that he allowed himself only five hours for sleep; by another, that when he gave him a letter of introduction he was asked to call at five the next morning, and found him already at work in his museum.

Such as these were Hunter's habits during at least the last thirty years of his life; and it was not in busy

idleness that he spent this time. Counted in mere quantity, very few have left so large results of scientific labour as he did. Besides the four published volumes of his works, he left a vast number of manuscripts written or dictated by himself. He dissected more than 500 species of animals, and of some of these many different examples. Of these dissections he left descriptions of more than 300; and besides these were all his studies of human anatomy, and the dissections of hundreds, or even of thousands, of diseased structures. His museum contained nearly 14,000 specimens, and all these he had either prepared or at least personally and closely studied. Nearly the whole of this work was done in thirty years: during all that time he was active in the practice of surgery; and as he grew older he only worked the more. His latest letters are more than ever full and urgent to his friends to send him everything from which he could gather knowledge—not merely things rare or wonderful, but whatever could be studied, whatever could yield facts for clearing or enlarging his view of life.<sup>1</sup>

Even his amusements, as he calls them, were what idle men would call hard work. ‘I amuse myself,’ he says, ‘with bees;’ and the results are told in essays which one of the best recent writers calls ‘almost faultless.’<sup>2</sup> They are full of minute observations and of careful and ingenious experiment and thought; they show that habit of his mind in which it always watched small things, as if they might indicate great laws; they might alone have gained for him a good scientific reputation.

<sup>1</sup> See Note E.

<sup>2</sup> E. L. Ormerod, *Natural History of Wasps*, p. 7.

Or, in evidence of the quantity of work that he would devote to one investigation, hear what he says of his observations on the development of the young bird within the egg. For the purpose of observing it better than he could, though he made many trials, in the eggs of chickens, he says: 'I kept a flock of geese for more than fifteen years, and by depriving them of their first brood in my investigations, they commonly bred again the same season.' And: 'As hours make a difference in the first days, it becomes necessary to examine in the night as well as in the day, by which reason the latter brood in the summer is best adapted, having then short nights.'<sup>1</sup>

Surely one might suppose that this was the great work of his life; this hourly occupation by day and night for parts of fifteen years. Yet it seems to have been rather a casual by-the-way pursuit. He became, indeed, so charmed with the study of the young birds in eggs that he says: 'It would almost appear that this mode of propagation was intended for investigation;' and yet, though he attained knowledge far in advance of all before or with him, he did not publish it, and the extent of his researches was not nearly known till long after his death.

The range of Hunter's work matched with its quantity and the time devoted to it. Never before or since—I think I am safe in saying this—never before or since has any man been at one time a thorough student and investigator in so wide a field of science. He was an enthusiastic naturalist; as a comparative anatomist and

<sup>1</sup> *Essays and Observations*, vol. i. p. 206, and Note E.

physiologist he was quite unrivalled; among the pathologists of his time he was by far the first; among the few geologists and students of vegetable physiology he was one, if not chief; and he was a great practical surgeon, surgeon to a large hospital, and holding for some years the largest practice in this town. In all these subjects at one time, no one but Hunter has ever been eminent and active.

And it is not only in the range but in the depth and thoroughness of his scientific work that he is distinguished. It is not possible now to tell, by any examples, the thoroughness of his scientific work. Let me say only, that in the whole range of subjects which I just now indicated there was not one which he did not study as completely as was possible; not one in which he did not enlarge the area of enquiry far beyond that covered by those before him. In every department of the sciences of life he made investigations wholly original; he observed and recorded facts past counting; he discerned in his facts large general laws.

These notes concerning Hunter's work tell the chief characters of his mind; massiveness and grandeur of design appear in all he did; and in perfect harmony with these was the simplicity of his usual method of work. It was, mainly, the orderly accumulation of facts of every kind from every source, and the building of them up in the plainest inductions. If he had been an architect, he would have built huge pyramids, and every stone would have borne its own inscription. He knew nothing of logic or of the science of thought; he used his natural mental powers, as with a natural instinct—used them with all his

might, but without art or consciousness of method. I know no instance more signal than was in him of the living force there is in facts when they are stored in a thoughtful mind.

But Hunter was not only a great observer ; he was a very accurate one. Among the masses of facts recorded by him, it would be hard to find any that are erroneously observed or stated : when there are errors in his works they are errors of reasoning, not of observation.

And I note it as an exemplary instance of his accuracy, that when he tells his general inferences from facts, he habitually uses words implying that he regarded them as only probable. A fact he tells without conditions ; when he generalises, it is commonly with such words as 'I conceive,' 'I suspect,' 'I am disposed to believe,' or the like.

I think, too, that no instance can be found in which he tried to add to the strength of evidence by strong personal assertion ; as if his opinion were to be taken for weight in an estimate of probability. Nay, there are very rarely any expressions implying strong conviction on any large question in biology. No one, I think, knew better than Hunter that, in science, strong convictions are not usually the signs of knowledge. He seems to have always felt that, in the consideration of general principles, he had only reached near to the greatest probability attainable at the time ; that another year or more of investigation would bring him nearer the truth, and that which now seemed right would be surpassed or set aside. He used even thus to tell the pupils at his lectures : 'Don't take notes of this ; I dare say I shall change it all next year.'<sup>1</sup>

<sup>1</sup> Similarly in *Ottley's Life*, p. 40.

It is another sign of this wise caution that he always hesitated to publish his knowledge. He worked for eighteen years before he published anything in his own name. He was forty-three when he published his first book, that on the Teeth; he began to collect the materials of his great work on the Blood and Inflammation while he was a student; some of the experiments recorded in it were made while he was house-surgeon at St. George's; he worked at it for forty years, and began to print it only just before he died.

And he was as patient as he was cautious. Abernethy, who knew him well, says: 'It is scarcely credible with what patience Mr. Hunter examined the lower kinds of animals;' and he quotes Mr. Clift as saying, 'that he would stand for hours, motionless as a statue, except that, with a pair of forceps in either hand, he was picking asunder the connecting fibres of some structure' he was studying. A very striking picture: for this was in the last year of Hunter's life; he was growing old; he had lately been very ill, and he knew that he was in instant peril of that sudden death in which, at last, he fell; he was poor, for all that he could earn, and more, he needed for his collection; and he was overworked in practice and in the duties of Surgeon-General to the Army. Yet 'he would stand for hours, motionless as a statue;' patient and watchful as a prophet, as if he were sure that the truth would come, whether in the gradual unveiling of new forms, or in the clearing of some mental cloud, or as in a sudden flash, with which, as in an inspiration, the intellectual darkness becomes light.<sup>1</sup>

<sup>1</sup> See Note F.

In all these indications of Hunter's character we may observe, together with grandeur in design, and a power and strong will well proportioned to his design, an unusual prudence in all the work of observation; and yet he was very fond of scientific enterprise and speculation. The qualities may seem incongruous; but they are associated in the most attractive minds, and may be traced in Darwin and others of the best of our own time.

Enterprise was shown in his devotion to experiment. If there were one class of facts which he loved better than all besides, it was of those which he could thus obtain. He seems to have had a very keen enjoyment of that mental state in which is the very spirit of enterprise; the state in which the mind waits, watching for the solution of a problem which itself has made, standing as it were in the presence of the about-to-be-known.

And, as he was always thinking-out beyond the facts which he could collect in the normal course of nature, always projecting his mind beyond his knowledge, so he made every question that he could the subject of experiment. He used to say to those who seemed content with thinking about what might be known: 'Don't think: try; be patient; be accurate.'<sup>1</sup>

But, where observation and experiment could not reach, few were bolder in thinking than Hunter was. His long practice in experiments justified him in this, by educating him for more distant mental enterprise; for a well-devised experiment, such as many of his were, deserves the name of project, in that the mind, throwing itself forward in advance of present knowledge, believes

<sup>1</sup> Baron's *Life of Jenner*, vol. i. p. 124.



that the truth must be in one of two or a few more probabilities, and then devises means for ascertaining where it is; and a mind which has been strengthened and long trained in this kind of exercise may sometimes safely project itself much further, and, going beyond the range of experiment, may discern a general truth very far in advance of ascertained facts, or even from a stand-point of partial error. Hunter could sometimes, with very striking power and precision, thus think the truth.

Thus, for one example, he thought the truth that the blood is alive; not in any supernatural or transcendent sense, as some before him thought, but in the same sense as are all other parts of the same living body. In this sense his discernment of the life of the blood was a real discovery; not a guess, or, in the worser sense, a mere scientific imagination; for he saw fully the bearings of the doctrine, and it guided him to some of the first steps in his true pathology of the blood.

The truth is now proved beyond all doubt: but if we look to the facts on which Hunter first founded his decision, they seem insufficient; and we have to assign the discovery chiefly to the power of his strong, far-seeing mind looking out beyond all evidence.

Similarly, in his essay on the development of the chick, he indicates, though from what may be thought too few facts, that great and marvellous law in development, that every higher animal, in its progress from the embryo to the complete form, passes through a series of changes, in each of which it resembles the complete form of some order lower than itself.<sup>1</sup> And this discovery, like

<sup>1</sup> *Physiological Catalogue* by Owen, vol. i. p. ii.

the last, was not a lucky guess, just made and then left. He saw nearly all its importance. It became a fruitful doctrine, guiding or confirming him in the assurance which determined a large portion of his studies, that, in the whole range of physiology, every lower form of life should be studied for the simpler and the elemental instances of the functions performed in the higher.

And I find at least one instance of his projecting his mind far into the doctrine of evolution, though this time fruitlessly. In writing on hermaphroditism, which he studied very carefully, he says, in a foot-note: 'Query: Is there ever, in the genera of animals that are natural hermaphrodites, a separation of the two parts forming distinct sexes? If there is, it may account for the distinction of sexes ever having happened.'<sup>1</sup>

It was natural that one who could thus discern great truths far off should strive for a decision on that question in biology which, from the earliest days of scientific thought, has never ceased to be discussed—the question, What is Life? Hunter strove for an answer to it, and his opinion greatly affected his pursuits, and, much more, for a time, his influence and his reputation in medical science. He spoke of life as a 'vital principle,' a something separate from organisation; and, although he spoke also of a *materia vitæ diffusa*, and of a *materia vitæ coacervata* in the brain, yet I cannot doubt that he meant something that was not material or a mere property of matter. I believe that he intended by his 'vital principle' that which Joseph Henry Green, the most philosophic and eloquent of his interpreters, held—'a power anterior

<sup>1</sup> *Works*, vol. iv. p. 36. See also *Essays and Observations*, vol. i. p. 249.

in the order of thought to the organisation which it animates, sustains, and repairs; a power originative and constructive.’<sup>1</sup>

But Hunter could not clearly express this and, I believe, he could not clearly think it. For it cannot be denied that on this and some allied subjects he wrote very obscurely—so obscurely and so variously, that when we have granted all we can for the common difficulty of finding words for profound thoughts, and all we justly may for our own defects of apprehension, we cannot but believe that his mind was not clear upon them. And this, I believe, we may refer to one of the few intellectual defects that can be traced in him—namely, the great inequality of his powers of language and of thought.

In every mind thoughts and words are so interwoven that each shares always the qualities of the other. Thoughts and words are like mutual reflectors: if either of them distorts an object placed between them, the other cannot but receive the distorted image and reflect it. Or each is, alternately, master and servant. Now thought employs words for its expression, and then these same words take part in directing the next thought. If either be defective or erroneous the other suffers.

Hunter was a great master of facts, and in plain and customary English he could with great power collect, compare, arrange, and construct whatever could be made from them; but he was not a master of words. His large, strong mind does not in anything show that subtlety which, whether in thinking or in writing, can accurately employ many words of scarcely different meanings—a

<sup>1</sup> *Hunterian Oration*, 1848.

quality which is very necessary for the consideration of abstract ideas, and in which a defect is a hindrance, not only to the expression of thoughts, but to the process of thinking.

Hunter's defect in this respect may have been due, in part, to his neglect of early education ; but chiefly, I think, it was natural. In many other things he corrected all the faults that could be referred to neglected education ; in language, whether in speaking or writing, he was, to the last, deficient ; and his thinking power, strong as it may have been by nature, was hindered and baffled by its weak associate.<sup>1</sup>

Nevertheless, however incomplete his thoughts on the vital principle may have been, he worked well with it as an hypothesis. With its help he threw off the fetters of the erroneous chemical and physical doctrines which, just before his time, were prevalent in physiology. It led him to larger and clearer views of the work to which he gave himself ; it was as a single band holding together all the objects of his study. Moreover, some of his pupils made the doctrine of a vital principle the chief ground of his reputation ; and though it was neither a new doctrine nor essential to the weightiest part of his teaching, yet it became a chief dogma of his school, and the discussion of it served usefully, in a time of need, to keep alive his reputation and the praise of his great example.<sup>2</sup>

But what seems to me, at this point, most instructive in respect of the character of Hunter is the just estimate which he made of the relative values of hypotheses and

<sup>1</sup> See Note G.

<sup>2</sup> See Note H.

facts. His hypotheses, whether on the vital principle or on any other subject, never diminished his zeal for facts. He stands well that severe test of the strength of a scientific mind—the test of resistance against subjection to its own hypotheses. The feebler men worship the works of their own minds; they fall down before their own idols made with words; they feel more sure of what they call their principles than of plain facts. It was not so with Hunter. He may have admired the hypothesis of a vital principle—and he used it wisely—but he much more admired the observation and right use of facts. He collected them as with an avarice; he kept them pure, in memory and manuscript; compared, arranged, and read in them, as he could, the laws of life. Herein was the principal, the best, the most abiding of his works; hence was his great influence in science.

But in Hunter's mind, careful in observing, bold in speculating, we have an epitome of the natural course and temper of biology. It is eminently a science of observation; and yet none who love to think can study the phenomena of life without asking themselves, What is life? and, still beyond this, Whence is life derived? 'An imperious instinct commands us to look beyond or beneath the phenomena;' we cannot believe that it is impossible for us to reach far beyond the evidence of sense; and even when beyond the phenomena there are discerned, as we believe, forces measurable and correlated, still, we cannot rest here; for the knowledge of the manner in which forces act tells nothing of their origin; and this, especially in respect of life and mind, is what we earnestly desire to know. Whence comes the force of life? Is it

‘a power anterior to the organisation?’ Is it ‘a power originative and constructive?’

I do not doubt that in a doctrine of vital force as correlated with physical forces we are nearer to the truth than in the doctrine of the Hunterian School, that life is wholly unlike and alien from other means and methods of activity. But the holding of the correlation and mutual conversion of the physical and vital forces does not determine the precedence of either the one or the other. If they are mutually convertible, either may have preceded; a vital force may have preceded the physical, though life was manifested very late upon this planet in any of the phenomena in which we now can study it.

And even if we were to hold the conversion of physical or vital force into consciousness and will—though from this what I believe to be my consciousness and my will are utterly repugnant—yet this would not prove the precedence of the physical force. The opposite conversion can be as well, or as ill, traced. Therefore, mental force, self-consciousness, and will, may have preceded other forms of force; mind may have existed before any of the properties of matter; and thus, even in the view of science, the first essence may have been a Being willing and knowing, and this Being may have been the prime source of all the forces whose operation we now trace.

There is nothing, I believe, in science to disprove such a belief as this; but I doubt whether it is within the power of science alone to determine certainly an order of precedence among forces. I cannot conceive of anything beyond or before a natural force except a supernatural will; and it is a fact to be weighed, that a belief such as this is

held by untutored minds, as if it were instinctive knowledge. Man seems naturally prone to think that above all that appears in the world there must be a Mind or minds, in the image of which his own is made, and with which he is in some kind of personal relation. But the proof of these things is not yet reached by science; and till it reaches proof, science cannot rest, must not rest. But the firm and life-guiding belief that a supernatural Will and Knowledge was, and is, and will be, and the lessons of our personal relation to It, may rest secure on the whole and manifold evidences of the Christian faith. They sometimes are in conflict with what we hold to be true in science. Then let us wait, and strive that where there cannot be concord, there may, at least, be truce. Time or, if not time, eternity will show that science and Christian theology are two sides of truth, and that both sides are as yet only known in part.

But I leave this, which may seem a too far digression, that I may revert to that one part of Hunter's mind which remained, with little change, from his days of idleness in the Scotch farm: I mean his unconsciousness of his mental power.

He could be provoked into saying that he knew himself to be better than some of those who spoke ill of him, but he declared that he felt 'a mere pigmy' when he looked at the work to be done. Even the sensitive vexation with which he sometimes spoke of rivals in surgery is enough to prove that he was unconscious of having done work great enough and good enough to win the highest fame. He appears as one desiring renown, but doubtful whether he had gained

or deserved to gain it. As he bears other tests of mental greatness, so he bears this—the test of self-unconsciousness. And it was happy for science that it should be so. For if Hunter had thought of himself as we think of him, wherein we must hold that he would only have thought justly, he could scarcely have failed to become self-enamoured, and he would have lost time in trying to select work adequate to the grandeur of his mind, and to set his mind in attitudes attracting a just homage. And, according to his own judgment, he would have failed; for, as he wrote, with even more than usual disparity of wisdom and of words: ‘There never was a man that wanted to be a great man ever was a great man.’

And now, what did he achieve? What influence did he exercise on the progress of knowledge?

We have seen that his work was various: so were its consequences; and in these we may discern, I think, a striking illustration of the well-known rule, that, before great truths can be taught, the minds of a people or of a society must have attained a certain capacity and desire to learn, and that the capacity and desire must be, not general, but with special fitness in the subject of the new teaching.

Hunter studied living things as well in disease as in health. In both states he saw the same power and the same general design, though in diseases often overborne; and, in his view, the differences between disease and health were conditional, not essential. They were to be studied as closely related parts of one science of life. But he had too much common sense not to see the broad



practical differences between health and disease. He taught them separately, wrote of them separately, and in the study of his influence and reputation we must make a similar separation.

Hunter's greatest work was in physiology. Using that word in its fullest meaning, as the whole science of the normal life of all things that live or have lived, he grasped this science with the widest mental grasp. In his study of comparative anatomy and physiology, which he may justly be said to have introduced into this country, he saw and showed the way to the whole study of life; and this he did as of his own force. He neither followed others, nor merely drew a plan on which other men might work; but with his own mind he planned, and with his own hand he wrought, a larger and a truer work in the whole science of living things than any man before him. And in this work no man succeeded him.

His lesser work, great as it was—greater, I think, than that of any man before or since—was in pathology; yet of this lesser work the direct influence was far greater than that of his greatest achievements in physiology.

For from among his pupils there went out all the great English surgeons of the time next after him. Abernethy, Astley Cooper, Cline, Home, Lynn, Blizard, these all learned of him, and all were chief teachers of surgery in chief schools of London: they boasted of being his pupils, they taught in his method, and it became a tradition in their schools. Hunter was thus, in the fullest sense, the founder of a school of surgery.<sup>1</sup> But among all his pupils there was not one who gave

<sup>1</sup> See Note I.

himself to physiology, not one who studied it as he did, not one who continued the great works he left unfinished.

And although Hunter was an active and influential fellow of the Royal Society, a friend and companion of the leaders in science, the founder and patron of a scientific society,<sup>1</sup> in high repute as the chief anatomist and naturalist of his time, yet in his great work of comparative anatomy and physiology not one of the younger men of science imitated him; in the higher sciences he had not one true disciple.

How may this contrast be explained? Chiefly, I think, by the difference in the levels of men's minds in respect of the two subjects. There was as yet in this country no desire for comparative anatomy or physiology or any of the deeper objective studies of life. There was as yet no 'taste,' as we say, for these things, for none but Hunter had yet tasted in them the happiness of intellectual exercise.

In pathology it was very different. It had never been more actively studied than in Hunter's time. Practitioners of medicine and surgery were ready and able to receive his teaching; and though in his lifetime it hardly excited enthusiasm, yet the best of those who heard it saw that it showed the right way to knowledge, and that if their art were to be improved it must be by work on broader ground than ever before, and by men of larger higher culture.

In comparative anatomy and physiology Hunter was in advance of his time. Not far in advance, for Cuvier

<sup>1</sup> *The Lyceum medicum Londinense*. See *Ottley's Life*, p. 85, and Chevalier's *Hunterian Oration*, 1821, p. 78.

and Meckel quickly followed him; and then these sciences became, as they are now, the studies of some of the largest intellects. And it may well be, that if Hunter had been more apt to teach he would not have been without disciples. Some men by personal influence can make disciples even prematurely. They hasten the unready, attract or compel the unwilling. They are founders of schools before themselves are quite fit to be called scholars. Hunter was utterly void of the qualities by which such teachers make their schools. He had no attractions easy to be felt, no power of persuasion in speech or manner. His lectures were dull, tedious, ill-delivered.<sup>1</sup> He was so busy in his search for knowledge, and so cautious in his estimate of it, that he always delayed to publish what he knew. It was only by the sheer force of his work and example that he could have moved men to follow him. These were enough in surgery and medicine, not enough in the deeper physiology. And thus it was that when he died, poor and with work half done, there was scarcely one who knew how vast and various his labours in this field had been; there was not one who could complete his unfinished essays or the catalogues of his collection. The treasures of his museum and his manuscripts remained unknown for many years. His works had been like waves in advance of the on-coming tide. A few that watched them thought them grand and beautiful; but they broke on the shore in what seemed like only trouble and confusion, and the tide passed over them and hid the treasures they had borne.<sup>2</sup>

It was not till Owen came that the treasures were

<sup>1</sup> See Note J.

<sup>2</sup> See Note K.

recovered and worthily displayed. But by this time others had done much of the work of Hunter, and had reaped the just reward. Still it is of historic and personal interest to see in Owen's catalogues of the physiological portion of the museum, and more completely in his two volumes of Hunter's 'Essays and Observations,' that Hunter had done vastly larger work in all the biological sciences than had appeared in what he published in his lifetime. That had been enough to prove him first among the biologists of his day; these showed more: they showed a yet wider range of study, and especially that, as Professor Flower has written, 'Hunter had collected materials for a work which needed but the finishing touches to have made it one of the greatest, most durable, and valuable contributions ever made by any one man to the advancement of the science of comparative anatomy.'<sup>1</sup>

It may seem useless to dwell on these things and revive the vain regret that, not Hunter alone, but England, lost such honours; but it is not useless to show the greatness and true character of the mind by which our English—I mean, of course, our national—school of surgery was founded; for it is only by imitation, however distant, that the worth and honour of the school can be maintained.

Hunter's great renown is commonly told by saying that he was the founder of scientific surgery: and so he was; for he first studied and taught, in the light and with the methods of a large knowledge of physiology, the very processes of disease and repair with which the practice of surgery is concerned. There were excellent surgeons

<sup>1</sup> Introductory Lecture, Feb. 14, 1870.

before him and in his own time—sagacious, observant, practical men, by whose researches surgery was advancing rapidly in utility and precision. Not to speak of the best members of the French Academy, there were in Hunter's time at least three in this country, Cheselden, Percivall Pott, and Samuel Sharp. Of the first two Hunter was, for a short time, a pupil; and they were all practical surgeons of the highest order, rich in experience, and teaching their experience in well-expressed rules. It is great praise of him to say that, as a practical surgeon, he was worthy to succeed them.

But all the surgery before the time of Hunter was only that of experience, and, in so far as it was a science at all, it stood alone. It was scarcely combined with medicine; and it was not only a happy saying, but a recent doctrine which Abernethy expressed when, following Hunter, he said that medicine and surgery should be, with the title of the French republic, one and indivisible. To the sciences beyond medicine, surgery had no affinity at all. Surgery and physiology were far asunder; no one strong mind had ever deeply studied both and become conscious that both were parts of the same science of living things, and that each might give light to the other, and each be a test of the other's truth.

This was Hunter's greatest work in and for surgery. He brought the scientific method into the study of the practice, and he welded scientific knowledge with the lessons of experience. If we compare his works with those of Percivall Pott, the best of all his predecessors, the difference is clear. In practical surgery Pott generally appears more thoroughly instructed, a more 'compleat

surgeon ;' but with the science and the exposition of principles, Hunter alone deals worthily.<sup>1</sup>

And in all this Hunter was not only a thinker ; he was a great worker. Any physiologist might have shown the utility of science for the improvement of the art of surgery ; but, as I said of Hunter's physiological work, so of this—with his own mind he planned and, as with his own hand, he did the work. He worked in scientific surgery with all the mental power, the variety of method, and the concentrated light that could be gained in the largest study of biology. He added to the knowledge of his time new facts and principles in surgery which it is literally impossible to count or over-value. His books are full of them.<sup>2</sup>

To some readers of the surgical works of Hunter this may seem too high an estimate. Later researches, they may say, have found them very defective, sometimes erroneous, often insufficient, and unfit for place in modern systems. Forty years ago—that is nearly midway between Hunter's time and this—Mr. Palmer, the excellent editor of the best edition of the works, tried, by the addition of copious notes, to bring them into accordance with the pathology then accepted. We may now see with a kind of sad amusement that the notes need nearly as much amendment as the text ; sometimes even more.

This is inevitable in science. This must be till the perfection of knowledge is attained. And yet that which once seemed true, and by men capable of judging was held to be true, may still command our admiration. For the body of science is like an organic world in process of evolution. At every time each living form is, in itself,

<sup>1</sup> See Note L.

<sup>2</sup> See Note M.

complete, its parts are all in mutual fitness, and it is adapted to all the conditions in which it has to live. But every living form is transient; it passes while some higher form is being evolved from it, and this lives its time, and in its turn evolves some form yet higher and nearer to what we deem perfection.

It is so with the doctrines of science. As we look back in its history, we see grotesque forms of knowledge or belief, the extinct creations of observant, thoughtful men; and when we see how unfit they are to be associated with the forms and conditions of knowledge in our own time, we are apt to conclude that they were worse than incomplete; not merely shortcomings, but errors. Doubtless many were so; they were as species decaying and dying-out; deflections from the true route of progress. But many doctrines which now look like monstrous forms were, in their own time, very good; they fitted-in with the whole body of science then existent; they were as parts of an organic system, complete for its own time, potent for a better future. To those who possessed them they were right, even as to ourselves much of our knowledge is; though we cannot doubt that, a century or two hence, many of what now seem complete truths will be like extinct or monstrous forms, and of our very words few will remain in science with the same meanings as they bear now.

And in this is no disparagement of knowledge. That cannot be despicable which is, for the present, the best possible, and has in itself capacity for change to a yet better future. But, similarly, that must not be despised which, in the past, was good, and though it

fell short of the truth was not wholly erroneous from it. So, in estimating Hunter's contributions to the truths and laws of science, we must not scorn all those which have not borne unchanged the test of time; it would be as unreasonable to scorn a noble ancestry.

I have said much of Hunter's scientific surgery; and his great renown must rest on it. But I desire to correct an error into which, I think, some of his eulogists have fallen, when they have implied that his surgical practice was always based upon his scientific knowledge, and that no practice can be good unless it be deduced from physiology or pathology, or be, at least, consistent with what is held to be true in them.

Now, as to Hunter—and herein, again, he may be our model—he was very cautious in deductions. Few, I think, have known better than he did the danger of reasoning from physiology into practical surgery. As he wrote: 'The man who judges from general principles only, shows ignorance; few things are so simple as to come wholly within a general principle. We should never reason on general principles only, much less practise upon them, when we are or can be master of all the facts; but, when we have nothing else but the general principle, then we must take it for our guide.'<sup>1</sup>

And his obedience to this wise rule is shown in the fact, that in many of his writings on surgical practice there is hardly a sign that he was a great physiologist. In his 'Treatise on the Venereal Disease' there is not a sentence that would plainly tell it; and even in his great, and chiefly physiological, work on 'Inflammation,' there is

<sup>1</sup> *Essays and Observations*, vol. i. p. 263.



no attempt to show that the right practice of surgery can be deduced from physiology. Even from pathology the practical deductions are very few. In all his practical writings we can detect the same scientific mind as was at work in physiology; the same care and laborious activity in collecting facts; the same quickness and usual accuracy in generalising; but the whole effort is to 'be master of all the facts,' and to learn and teach from them.

For one great example: it was by thus bringing the force of the scientific mind and method to bear on the facts of practical surgery, that Hunter achieved his great invention—that of curing aneurism by tying the artery far above the diseased part. This was not the result of any laborious physiological induction; it was mainly derived from facts very cautiously observed in the wards and dead-house. I shall not discuss Hunter's right to the honour of this invention: it is as clear as that of any discoverer of any fact in science. If any arbitration be needed between Anel and Desault on the one hand, and Hunter on the other, or any between France and England—for the question has been made of national interest—let the arbitrator be the Italian, Assalini. He had the singular good fortune to see three decisive operations. In 1781, he saw Spezzani tie the femoral artery in the sheath of the triceps muscle, preparatory to an intended amputation for a popliteal aneurism. In June 1785, he saw Desault, in Paris, tie the popliteal artery above a popliteal aneurism, which he did not lay open. In December of the same year he saw Hunter, at St. George's Hospital, for the same disease, tie the femoral artery in the canal of the triceps, and this operation, he

says, 'excited the greatest wonder, and awakened the attention of all the surgeons of Europe.'<sup>1</sup>

It was really a splendid achievement, and its utility is not half told by counting the thousands of lives that it has saved. Its higher value is that it still abides as a great testimony of the power of the scientific mind in surgery. I think it has done more than any other of Hunter's works to make not only surgery but surgeons scientific.<sup>2</sup> And herein is his greatest influence; for never in this country, since his time, has the study and teaching of practical surgery been divorced from the science of biology. The scientific spirit has never failed. It has been variously prevalent in different men and at different schools: but it has never failed; and even the most practical parts of surgery are now studied with such scientific method and completeness as before Hunter's time were never thought of.

We have still our distinctions of practical and scientific surgery, of the art and the science. And though the differences between them diminish every year, yet they will remain; and it is well they should do so, for they are suited to men of different tempers, tastes, or opportunities. Yes; both will remain, though Fergusson is gone: the greatest master of the art, the greatest practical surgeon of our time; and men can no longer watch the eyes that were so keen, or try to imitate the hands that were so strong and yet so sensitive and swift and light; or wonder at the ready and clear knowledge, the prompt invention, the perfect calmness in the midst of danger.

<sup>1</sup> Assalini, *Manuale di Chirurgia*, Parte Prima, p. 89. <sup>2</sup> See Note N.

These all are gone, and with them all that multiplied tenfold their charm—the warm heart, the friendliness, the generous rivalry, the social grace. These, too, are gone ; but the memory of his lessons will remain with us ; and, practical as he was, Fergusson would have taught that every surgeon should have, according to his ability, both art and science, and should work at both, as with two hands. Either science or art alone can do many things ; even a one-handed man is far from helpless ; but the two hands are better ; and they should work together in harmony, with mutual help ; for the best work can be done only when the power and skill of science and art are combined as with one thought and one design. It was thus that Hunter wrought in surgery.

And mark, now, what he did for surgeons. Before his time they held a subordinate place in the medical profession. A few, with rare ability, had held good rank—as Wiseman, Cheselden, Hawkins, and Pott—but generally they were inferior to the physicians. And justly so ; for the physicians had not only better knowledge of their proper calling, but a far larger number of them were men of higher culture, well-educated gentlemen, and the associates of gentlemen. Besides, they were the chief teachers of all the medical sciences, the teachers even of anatomy to the surgeons. After the time of Hunter we may trace a well-marked change. Physicians worthily maintained their rank, as they do now ; but surgeons rose to it, and in the lessons of Hunter surgery gratefully repaid medicine for the teachings of a century. Following Hunter in the pursuit of science,

surgeons soon became the chief anatomists, equal as physiologists and pathologists, and they gained entrance into the ranks of the most educated class. Yes; Hunter did more than anyone to make us gentlemen. And the lesson of this fact is plain and emphatic, for it was not by force of social skill, by money, or any external advantage that he did this. From the few records that we have of him it is clear that he was a rough and simple-mannered man, abrupt and plain in speech, warm-hearted and sometimes rashly generous, emotional and impetuous, quickly moved to tears of sympathy, quickly ablaze with anger and fierce words, never personally attractive, or seeming to have great mental powers, and always far too busy to think of influencing those around him. He had few friends, he gained the personal regard of very few, and no one paid him the homage of mimicry.<sup>1</sup> The vast influence which he exercised on surgery and surgeons was the influence of the scientific mind. What follows? Surely, that if we desire to maintain the rank of gentlemen, to hold this highest prize of our profession, we must do so by the highest scientific culture to which we can attain. And to this we are bound, not for our own advancement alone, but by every motive of the plainest duty.

These are some of the grounds on which, beyond all dispute, John Hunter's memory deserves the honour that we pay to it to-day. And these are not nearly all; in want of time I have omitted many, in want of just appreciation more; and whatever one might now tell, one could not estimate his claim to future honour. The

<sup>1</sup> See Note O.

influence of such men as Hunter reaches far beyond the time and space of their conscious activity ; their true thoughts live after them. Their true thoughts not only endure and remain : in the continuity of mental life they really live ; they pass on from one generation to another, and in the minds of each succeeding generation they are developed, they grow, they attain more nearly to perfection.

Thus, when we honour the memory of Hunter, we honour not only that which is past, but that which is still present ; a still abiding power doing good. For Hunter's true thoughts still live in us, and they will live after us, and never cease to help and urge men onward in the pursuit of truth. In the world of mind he that is mortal may produce that which may be immortal.

## NOTES.

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IN studying the life of Hunter I found or thought of many things which could not be well used in the Oration, but may be worth printing, whether for amendment of some of its defects or for subjects for the thoughts of others. I have therefore arranged them in the following notes:—

### *Note A, to p. 3.*

I have not found evidence of an observation in any kind of science made by Hunter before he came to London. Sir Everard Home says<sup>1</sup> that he came in 1748, when he was twenty years old, and this agrees with the times assigned for his beginning to study under Cheselden and Pott. In an article in the *European Magazine* in 1782, the materials for which, the editor told Mr. Abernethy,<sup>2</sup> were supplied by Hunter himself, it is said that he was eighteen when he came to town.

The best life of Hunter, by very far, is that by Drewry Ottley, prefixed to Palmer's edition of his works (Vol. I., 8vo. 18s.). I have taken from it the following calendar of the chief events of his life:—

1728. Born.

1748. Came to London.

1749–50. Studied at Chelsea Hospital, under Cheselden.

1751. Studied at St. Bartholomew's Hospital, under Pott and others.

1752. In Scotland.

1754. Studied at St. George's Hospital.

<sup>1</sup> Life, in the 4to. edition of the *Treatise on the Blood*, p. xv.

<sup>2</sup> *Physiological Lectures*, 8vo. 1822, Ed. ii. p. 201. The article is reprinted as an Appendix, p. 341.

- 1756. House Surgeon there.
- „ Became partner with his brother in the anatomical school.
- 1759. Threatened with consumption and obtained Staff-Surgeoncy in the Army.
- 1761. Served at the siege of Belleisle.
- 1762. Served in Portugal.
- 1763. Began to practise as a surgeon in London, and to lecture on anatomy and operative surgery.
- 1767. Elected F.R.S.
- 1768. Elected Surgeon to St. George's.
- 1770. Jenner became his house-pupil.
- 1771. Published his work on the Teeth.
- 1772. Married Miss Home.
- 1773. First attack of angina.
- 1774. Began lectures on the 'Principles of Surgery.'
- 1776. Appointed Surgeon-Extraordinary to the King.
- 1783. Elected a member of the Royal Society of Medicine and Royal Academy of Surgery of Paris.
- „ Began to build his Museum in Leicester Square; completed in 1785.
- 1785. Performed his operation for aneurism.
- 1786. Appointed Deputy-Surgeon-General to the Army.
- „ Published his work on the Venereal Disease, and his work on the Animal Economy.
- „ Received the Copley Medal of the Royal Society.
- „ Opened his Museum.
- 1789. Appointed Surgeon-General and Inspector.
- 1792. Ceased to lecture, being over-worked and in very uncertain health.
- „ Began printing his work on the Blood and Inflammation.
- 1793. Oct. 16. Sudden death at St. George's Hospital.

*Note B, to p. 3.*

The estimate which may be formed of the father of the Hunters, from a letter published by Dr. Simmons,<sup>1</sup> is confirmed by his portrait in the very interesting collection of Mr. W.

<sup>1</sup> *Life and Writings of the late William Hunter*, 8vo. 1783, p. 5, and see Ottery's *Life of John Hunter*, p. 2; and an excellent Essay on William Hunter by Dr. Matthews Duncan, in the *Edinburgh Medical Journal*, June 1876. William Hunter's character may also be studied in his *Two Introductory Lectures*, 4to. 1784,

Hunter Baillie, his great-grandson. One sister of the two Hunters, Dorothea, was mother of Dr. Matthew Baillie and Miss Joanna and Miss Agnes Baillie. The eldest son, James Hunter, was with his brother William for some time and died young; but he had given such evidence of talent as made William Hunter believe that if he had lived he would have become the leading physician in London.

*Note C, to p. 6.*

I am indebted to Messrs. Christie and Manson for the opportunity of reading the sale-catalogue of Hunter's collections and library. About 120 pictures were sold for £800. They were chiefly by old masters, including some of the best; and there were several by Hunter's chief contemporaries, Hogarth, Reynolds, Louthembourg, Zoffany, and Zuccarelli. Among them, also, were some medical portraits, including one of Harvey, by Janssen. The engravings, including a large collection of Hogarth's, sold for about £140; the 'curiosities' fetched about £200; and the books, including, I think, nothing significant, about £160. The proceeds of the four days' sale, in January and February 1794, amounted to nearly £1,300. Mr. Taylor, who was so good as to show me the catalogue, thought that a similar collection would sell now for £10,000.

It is hard to say whether Hunter's love of collecting pictures was connected with any real taste for the fine arts. I think it was; and that in this was the only instance of his studying anything but science. Mr. Rumsey, the best reporter of his lectures, says:<sup>1</sup> 'It has been said of Mr. John Hunter that he had a great dislike to works of imagination, his long study of matters of fact having rendered every other species of writing disagreeable to him.'

He had strong convictions on politics; but, if what is said at page 13 on the relation between knowledge and convictions be true, he may not have studied them. There is a letter of his in which he writes about his museum: 'If your friend is in London in October (and not a Democrat), he is welcomb

<sup>1</sup> *Life and Character of Thomas Bateman*. London, 1826, p. 89.



to see it; but I would rather see it in a blaze, like the Bastile, than show it to a Democrite, let his country be what it may.' And among the notes in the 'Essays and Observations,'<sup>1</sup> he says: 'All innovations on established systems that depend more on a belief than real knowledge (such as religion), arise rather from a weakness of mind than a fault in the system. Everything new carries a greater weight with it, and makes a deeper impression on a weak mind.'

*Note D, to p. 8.*

A 'Life of John Hunter' was published by Mr. Jesse Foot,<sup>2</sup> who had endeavoured to be his rival in practice, and failed. He took the part of Devil's advocate, and wrote with as much spite as even his client could have wished; depreciating as much as he could all that the Hunters did, and ascribing to bad motives all the good work that he could not deny. But the worst that one can fairly suspect, from the worst that he says or hints, is that John Hunter had a very keen love of scientific reputation, and that sometimes the provocation of controversy quickened his work and his publication of what he had done. This is, indeed, sometimes apparent in his writings;<sup>3</sup> but his desire for reputation is of a kind which rather indicates a doubt in his own mind as to whether he had any; and Jesse Foot's suggestion, that he worked at science only or chiefly that he might attract attention and get into practice as a surgeon, is too absurd. All the evidence tends the other way, and shows his earnest desire to live by surgery for science.

*Note E, to pp. 10, 11.*

Hunter's great industry impressed all who knew him, and is recorded by all who have written of him.<sup>4</sup> Even Jesse Foot says:<sup>5</sup> 'Perhaps there cannot be found his equal who so completely filled up time in active industry.' Of the quantity

<sup>1</sup> Vol. i. p. 267.

<sup>2</sup> London, 8vo. 1794.

<sup>3</sup> As in his *Lectures, Works*, vol. i. 208-10. *On the Blood, Inflammation, &c.*, *Works*, vol. iii. p. 2.

<sup>4</sup> Especially by Home in *Life*, pp. xviii. xxii. Otley in *Life*, pp. 54-5, &c. Thomas, *Hunterian Oration*, 1827. Lawrence, *Hunterian Oration*, 1846, p. 62.

<sup>5</sup> *Life*, p. 239.

of manuscripts left, Mr. Clift says :<sup>1</sup> ' There were, I should calculate, nearly, if not quite, a hundred volumes of folio MS. in forrel binding ; of course not all equally filled. We always wrote on the left-hand page only. . . . Besides these folios there were a very large number of smaller cases and memoirs in quarto, stitched.' Among these, probably, the manuscripts of Hunter's published as well as unpublished works were included. (See further, p. 51.)

It should be remembered, in further evidence of Hunter's strength of will, that he worked against the hindrances of frequent illness. The account given by Home of all he endured during the last twenty years of his life is a record of such distress as would have made an ordinary man utterly idle. In 1759 he had pneumonia, and was obliged to leave London. In 1769 and the following three years he had fits of gout ; in 1773 his first attack of angina ; in 1776 and 1785 he was again severely ill ; in 1789 he had cerebral disturbance ; in 1790 and the following three years were severe attacks of angina ; and during all this time he was in expectation of sudden death in some emotion, so that he used to say that ' his life was in the hands of any rascal who chose to annoy and tease him.'<sup>2</sup>

It is believed that Hunter did not begin to collect for his own museum till after his return from Portugal in 1763, and that all his previous collecting had been for his brother's museum, of which Home<sup>3</sup> says that he laid the foundation. But in the MS. essay on the *Pneumobranchiata*, in the College-Library, Hunter says in 1758, of a Mr. Lake, from whom he obtained some of the specimens described : ' I bought his whole collection of things.'

How keen he grew for facts as he grew old, may be seen in the following letter, written in the last year of his life to some friend in Africa. It is printed *literatim*.

Dear Sir,—I was favoured with your letter of September 31, informing me of 2 birds called the Habanah being shipped on board the Bull Dog, but unluckily the birds died on the passage home. I

<sup>1</sup> Lawrence, *Hunterian Oration*, 1846, p. 62.

<sup>2</sup> *Life*, by Ottley, p. 119.

<sup>3</sup> *Hunterian Oration*, 1814, p. 24.

consider myself as equally obliged to you for thinking of me and taking so much trouble. I was sorry at the loss of your insects, after all the trouble of collecting them, but I hope you will be more successful in future. I mentioned your proposal to Sir Joseph Banks of having a gardiner sent out, he told me he had had a letter or letters to that same purpose from you, therefore I suggested, if it was a scheme he approved of, he could settle that with you, therefore I dropd it. There is one thing I wish very much to have settled in Natural History, which is the Natural History of Swallows; they breed with us in the summer and leave us in the winter, and it is what becomes of them in our winter; now if they are with you in the winter, and if they should breed with you in that season, it would be a proof that they are birds of passage, and upon the same principle you should have many more in the winter than in the summer, as there are four or five different species in this country in the summer. I should like to have specimens of those that are with you in the winter. I remember seeing swallows in Portugal in the winter, but I cannot say what species they were. It would hardly be possible to get ostrach eggs just going to hatch, and to crush the shell and put them into proof spirits to preserve them till they came to England. If a Foal camell was put into a tub of spirits and sent, I should be glad. Is it possible to get a young tame lion, or indeed any other beast or Bird? If camelions were sent it should be in the spring, as then one could feed them with Flys through the summer. Are there any cuckews with you? we have none in the winter. I want everything respecting the Bee tribe, such as wasps with their nests, also hornets with theirs. They are a very large tribe. I would have sent you a paper I wrote on the anatomy of the Bees which was published in the Philosophical Transactions, but upon enquiry I found that it would cost you more than it is worth. I am a subscriber to the African Society, but I have not heard of the cachuna things, &c., but as I cannot always attend, they may have come without my knowing it. I consider myself very much obliged to you for your attention to me, and I wish I knew how I could return it, which would give me pleasure. I hope you keep your health well.

I am, dear Sir,

Your much obliged and humble servant,

January 15th, 1793.

JOHN HUNTER.

Hunter's want of ostrich's eggs for the study of the embryo is referred to by him in his manuscript 'On the Progress and Peculiarities of the Chick,' quoted in the Oration.<sup>1</sup> He says:

<sup>1</sup> *Essays and Observations*, vol. i. p. 205, *&c.*

‘I attempted the [eggs of the] swan, but it was impossible to procure such numbers as to give me all the necessary varieties. I endeavoured to procure ostrich’s eggs, by having them sent to me in spirits: but as the getting such was only a matter of chance, and only one or two in thirty years! nothing could be made out from them. For this purpose then I kept a flock of geese.’ . . . .

It is worth adding that Hunter studied this matter with great industry for nearly forty years. Abernethy says he began in 1755; and in the same manuscript he writes: ‘I got eels every month in the year from the fishmonger, with a view to catch them in the breeding season;’ and then: ‘Having failed in all my examinations on this part of the common eel, and being in the Island of Belleisle in the summer of 1761, where there was a vast number of Conger eels, I dissected some of them.’ . . . .

And still in 1793 he writes to Africa for ‘Ostrach eggs just going to hatch.’

*Note F, to p. 14.*

I am reminded of two instances of similar thinking in men of similar minds—Socrates and Sir Isaac Newton. Of the first it is told: ‘One morning he was thinking about something which he could not resolve; he would not give it up, but continued thinking from early dawn until noon: then he stood fixed in thought.’ And, after being in thought all day, ‘there he stood all night until the following morning; and with the return of light he offered up a prayer to the sun, and went his way.’<sup>1</sup> And of Newton that, ‘absorbed in thought, he would often sit down on his bed-side after he rose, and remain there for hours without dressing himself, occupied with some interesting investigation which had fixed his attention. Owing to the same absence of mind, he neglected to take the requisite quantity of nourishment, and it was therefore often necessary to remind him of his meals.’<sup>2</sup>

It seems a strange misuse of words to call this ‘absence of mind;’ for if the mind be in these long times engaged in con-

<sup>1</sup> *The Dialogues of Plato*, by Jowett, vol. ii. p. 71.

<sup>2</sup> *Life of Sir Isaac Newton*, by Sir David Brewster, 12mo. 1881, p. 341.

tinuous thought, it is eminently not absent, but present, self-determining, self-keeping. The power of thus thinking steadfastly and long, without the help of external objects, seems to be one of the highest results of the constant exercise of will in acts of attention. We can easily observe in ourselves the opposite habit of mind in the hours we spend in discursive useless thinking. We can trace the results of defective will in this and in the crowd of things daily seen, but, through want of attention, not observed, and in the wandering of thoughts as soon as they cease to be guided or fixed by the sensible impression of external objects.

Doubtless the power of long-continuous, steadfast thinking may be exercised automatically, and without any felt intention of the will in guidance or restraint; but, if this be so, it is an instance of that highest automatism in which acts which at first require the strongest efforts of will become, with long and careful practice, easy, and at last are habitually and almost unconsciously done better than at first they were done with great and attentive effort. I say almost unconsciously, for there is a consciousness of pleasure in such thinking. As Mr. Cline said of Hunter, 'He has often told me his delight was to think.'

In this view of such men as Socrates, Newton, and Hunter, we may reconcile Mr. Galton's<sup>1</sup> description of genius—'The automatic activity of the mind, as distinguished from the effort of the will'—with Mr. Carlyle's,<sup>2</sup> 'Genius (which means transcendent capacity of taking trouble, first of all)'. In meanings thus combined: Hunter may be called a man with genius.

*Note G, to p. 19.*

It cannot but greatly enhance our wonder at Hunter's power in science, when we think how little it was aided by education or any use of literature. Abernethy and many others tell of his difficulty in finding words for expressing his thoughts; and it is only too evident in his writings. But, of course, the same mental defect must have made it very difficult

<sup>1</sup> *Men of Science*, p. 233.    <sup>2</sup> *History of Frederick the Great*, vol. i. p. 415.

for him to learn the thoughts of others. It was, therefore, not through mere affectation or contempt that he always professed himself averse from reading. He doubtless found in observation and thought a far more easy method of learning.

His defects of language may best be seen in his notes in the 'Essays and Observations,' especially in those which Mr. Owen has arranged as 'Psychological,' or in some of his letters to Jenner in Ottley's 'Life.' In the works published during his life I believe that he always had literary assistance.<sup>1</sup> I do not suppose that anyone helped him in thinking, or in the general manner of expressing his thoughts; for in all his books and manuscripts there is a similar rugged style, which is entirely characteristic of him, and is clear enough when he is dealing with things he could observe. But he always needed help in spelling, and in words for scientific arrangements. I have never seen an autograph letter by him in which either the grammar or the spelling is correct; that which is printed in pp. 41-2 has unusually few errors.

His inability to deal with Latin or Greek is shown in a manuscript literally copied by Mr. Clift. In using the terms with which, Abernethy says,<sup>2</sup> 'his friends must have supplied him,' he wrote 'Pneumobrankes' for Pneumobranchiata, and 'Monocoilio, Diocoilio, Trecoilio, and Tætracoilio,' for Monocoilia, Dicoilia, &c.

As mere signs of unequal powers of observation, such differences in respect of written words and natural structures is surely very strange. We may be nearly certain that Hunter was rarely mistaken in observing or remembering the number or the forms of the cavities in any heart he ever saw. Why was he wrong in observing or remembering the letters in the words with which he wrote about hearts, and which had been supplied to him for the expression of facts noted by himself? Whatever may be the explanation, it must, I repeat, greatly enhance our admiration of his power in dealing with facts, when we see how little help he drew from words.

<sup>1</sup> For one instance, see Ottley's *Life*, p. 101.

<sup>2</sup> *Physiological Lectures*, 1822, p. 220.

Jesse Foot says<sup>1</sup> that Smollett, when he was editor of the *Critical Review*, helped the Hunters in the controversies conducted in his journal; and he adds: 'To say the truth, they could not have selected, out of every circle of authorship upon the face of the earth, a more bitter or clever fellow, not only for consolidating their ideas, but also for conducting them forth to the public.'

Perry, of the *Morning Chronicle*, was also a friend of both the Hunters, and wrote in high praise of them in the *European Magazine*, of which he was editor in 1782.<sup>2</sup> And though Hunter read very little, and was rather too fond of saying so and of scoffing at literature,<sup>3</sup> yet it is evident that he was not ill-informed on the works of others, for he never appears as spending time in ascertaining facts that were generally known.

*Note H, to p. 19.*

It is rather from his general method of using the hypothesis of a vital principle, than from any distinct statement of it, that I am led to believe that Hunter would have adopted the clear words of Mr. Green. The ambiguity of Hunter's expressions may be seen not only in his calling the same thing a principle and *materia*, but in any of his writings.<sup>4</sup>

I think that the clearest statement of his doctrine by any of his own pupils is that by Chevalier (Hunterian Oration, 1821).

Abernethy went far beyond Hunter in holding life to be not in any sense or degree a property of organised matter, but a distinct, subtle, and mobile fluid like, if not the same as, electricity was supposed to be. Lawrence, his old pupil, adopting the views of Bichat, opposed all this and ridiculed it. Thence arose a controversy between and around them which had all the

<sup>1</sup> *Life of John Hunter*, p. 61.

<sup>2</sup> Abernethy, *Physiological Lectures*, 1822, p. 201.

<sup>3</sup> *Ibid.* p. 344, and *Life* by Ottley, p. 14.

<sup>4</sup> For examples, in the *Essays and Observations*, vol. i. pp. 113-118, 123 204, &c. *Lectures in Works*, vol. i. pp. 219, 221, *c. s.*

attractions of being personal, keen-witted, and interminable, and of letting one side be charged with irreligion, the other with hindrance of the truth. It served the good purpose of keeping Hunter's works before men's minds; and though only doctrine was discussed, facts could not be quite lost sight of. The opponent doctrines appeared in the foreground; all could talk and some could think about them; but the talking and the thinking alike made the Hunterian surgery prominent and popular. They who scoffed at his doctrine seemed to have held themselves, more than others, bound to be profuse in their praise of his observations and his influence in surgery.<sup>1</sup>

Hunter's holding of a vital principle was an epoch-making event in the long history of doctrines concerning life, especially because it came in strong contrast with the teachings of Cullen, which had lately had great weight. In that long history we can trace a strong likeness in the successive arguments on each side: the words change in agreement with the advance of knowledge of facts, but the things contended for and the method of contention are very like; often, sides seem to be taken in accordance with the temper as much as with the intellectual character of the disputants; and the advances towards evident truth seem very small in proportion to the mental forces engaged.

The question to be determined is so high above mere matters of fact, that a century of observation seems hardly enough to diminish the distance; and, as great heights must be reached by zig-zag, so one sees an almost periodic swinging of general belief this way and that. Indeed, the tendency towards a predominance of each side in succession is so marked, that one may venture to expect soon a general opinion in favour of 'Life' as a 'power anterior in the order of thought to organisation.'

*Note I, to p. 24.*

A sentence of Haller's indicates that Hunter may be counted as really the first founder of a school of surgery: '*In Chirur-*

<sup>1</sup> See especially an article in the *Edinburgh Review*, 1814.



*gicis, nescio quomodo factum est, ut vix unquam perinde ut in aliis medicinae partibus magnus aliquis vir eminuerit, qui late posteros sequaces habuerit.*<sup>1</sup> But it would not be fair to omit William Hunter in the history of the advance of surgeons; for before he was a physician he was the first surgeon unconnected with a hospital who lectured on anatomy and surgery, and in his lectures he very far surpassed all the physicians and other surgeons of his time.

The influence of John Hunter as the founder of a school of surgery may be studied in a comparison of the works of surgeons of nearly similar characters, and holding the same positions, before and after him: as of Pott and Abernethy, Samuel Sharp and Astley Cooper, Bromfield and Home. The regular progress of surgery in the time between them may explain much of the contrast, but the influence of Hunter seems to me greater than all else besides.

I have not had time for a sufficient study of the works of foreign surgeons contemporary with Hunter to justify me in attempting particular comparisons with him; but certainly there was not one who studied surgery with the same scientific mind and plan, or who had so great influence on his successors, as Hunter had. There was not one whose works do not take their place naturally, and without marked prominence, in the gradual ascent of improvement in surgical knowledge—not one whose works mark an epoch.

*Note J, to p. 26.*

Even Abernethy cannot speak well of Hunter's power of teaching: 'With all his genius, knowledge, and reflection, Mr. Hunter was not, however, a brilliant character amongst us. He had not the happy talent of displaying the stores of his mind, nor of communicating to others the same perception of the importance of his facts and opinions as he himself entertained;' and 'he actually wearied his audience by the number of facts he recorded, and the minuteness and

<sup>1</sup> Haller, *Bibliotheca Chirurgica*, 1775, T. ii. p. 1.

accuracy with which he detailed them.'<sup>1</sup> Others tell of his language being 'inelegant and often coarse;' 'his delivery heavy and unengaging;' his method confused with attempts to find words for his thoughts, or else to read from little scraps of paper. His class appears to have varied from twenty to fifty, but it included, I think, nearly everyone who in the generation after him had any great reputation in surgery in this country; and however dull and confused his lectures may have been in delivery, the numerous copies of them that remain show that they were reducible to order and sufficient clearness.

Abernethy's expression justifies the belief that Hunter was not clear or impressive in his usual method of speaking on scientific subjects. If it were so—and certainly it is highly probable—we may better understand his having so little influence on those to whom he was in the habit of showing, and probably of describing, his museum on certain evenings in the autumn and spring.

He does not anywhere show any power of making knowledge easy, and, especially, he had no skill in arrangement. His comparative anatomy was studied, and his museum was arranged, not upon a zoological system (though he seems to have wished to construct one), but as for illustrating biology: a higher design, but one of far greater difficulty to students. As Abernethy says: 'Mr. Hunter knew nothing of systems.' 'He studied comparative anatomy for physiology, and hence made his arrangement.'<sup>2</sup>

*Note K, to p. 26.*

The statement that, at Hunter's death, there was not one of his pupils who could continue his work in physiology or complete his catalogues, may seem to need support. Jenner, it may be said, could have done it; and among all the pupils it was he whom Hunter would have had for his colleague if he had been able to carry out his 'scheme to teach natural history, in

<sup>1</sup> *Physiological Lectures*, 1821, p. 18, and 1822, p. 306.

<sup>2</sup> *Ibid.*, ed. 1822, p. 58.

which will be included anatomy, both human and comparative.<sup>1</sup> But, long before Hunter died, Jenner's mind was fully and well occupied in the promotion of vaccination. Hunter had made him a naturalist, not, I think, a physiologist; and with the habits of a naturalist he observed and studied, with a rare tenacity of purpose, the facts which led him to the great life-saving discovery. And, by the way, it must seem strange that Hunter took no interest in vaccination. He must often have heard of it from Jenner, who was constantly studying it from 1780 onwards, and who gave him a sketch of the vaccine vesicle, which he marked with his own hand. Yet he never studied it, nor discerned any of its vast importance in pathology, to say nothing of its utility.

Of Hunter's other pupils all were devoted to surgery, and, of the few who personally studied any comparative anatomy or physiology, only one passed beyond the outlines, or in any fair sense devoted himself to the study. Abernethy, Astley Cooper, Carlisle, Macartney, and some few more studied fragments, but their hearts were in surgery and its pathology. It may indeed be doubted whether any of them, except Abernethy, could have trained himself into the largeness of knowledge at that time requisite for the complete understanding of Hunter's work. Certainly not one of them tried.

The one who actively studied comparative anatomy was Sir Everard Home, Hunter's brother-in-law, assistant, and executor, and one of the founders of the Oration. Legally and naturally, when Hunter died, his museum, manuscripts, and 'everything' came into Home's charge, and for a time he did his best for them. Chiefly through his influence and urgency they were purchased by Government in 1799 for £15,000; partly in pity for Mrs. Hunter and her two children, and partly with a belief that they had real scientific value. They were committed into the charge of the College of Surgeons; and then it was of course supposed that, as he promised, Home, a member of the Council, would write catalogues and take care that the museum should be made

<sup>1</sup> Letter to Jenner in Ottley's *Life*, p. 55. This was in 1775. Was ever scientific enterprise more premature than this?

to illustrate the vast knowledge which he had seen Hunter accumulating. But Home became busy in practice, a leading surgeon, a leader in scientific society, ambitious for a great scientific reputation. And then as he grew old he became, I believe, the subject of one of those forms of senile degeneration in morality against which all men growing old need to guard. He stole from the Hunterian manuscripts, and then burnt them, after publishing many of Hunter's observations as his own. His plea that Hunter had desired him to destroy them is quite incredible; they were the very materials with which Hunter had hoped to complete the labour of his life, and if he had wished them to be destroyed Home would not first have kept them for thirty years.

But there is a glow of light over this dark story.

William Clift, a Cornish lad of seventeen, with a natural taste for drawing, came to live with Hunter twenty months before his death, and, in exchange for the privileges of apprenticeship, was to write and make drawings, to dissect and take part in the charge of the museum. At Hunter's death in poverty, Clift alone remained in personal charge of the museum and all the papers and drawings connected with it; and for six years he watched them, 'living,' as he says, 'with seven shillings a week at a time when the quartern loaf was, for a short period, two shillings,' and only helped occasionally with some spirit to repair the waste in the preparation-bottles. But his love for Hunter seems to have gathered strength in contemplation of the grandeur of his work, and his sense of duty gathered strength in the consciousness of sole responsibility. For duty and for love the Hunterian manuscripts were his constant study—'I had, I may say, no other books to read at that time,'<sup>1</sup>—and he copied volumes of them, and thus saved a great part of all that Home intended to destroy utterly.

It is not possible to tell how many, or on what subjects, were the manuscripts which, in spite of Mr. Clift's devotion, are lost to us. He hoped that he had saved nearly half of all that Hunter left; but certainly some, and perhaps many, of those

<sup>1</sup> Hunter, *Essays and Observations*, vol. ii. Appendix, p. 493.

which he did not copy were the manuscripts of published works. The notes of the lectures are gone, but their place is probably well filled by the numerous copies of notes made by pupils. And some 'Observations on Surgery' are lost; but, on the whole, I think that nearly all that was of great value was saved through Clift's fidelity.

All that was most important in the manuscripts is now published; the greater part by Mr. Owen in the 'Essays and Observations' and in his 'Physiological Catalogue' of the College Museum. Whatever related in any way to the Hunterian specimens of morbid anatomy is printed in my 'Pathological Catalogue.'

Neither Owen nor I will ever forget the evident happiness with which Clift watched the progress of the Catalogues, in which he saw the labours of his hard early life used as he believed that Hunter would have wished. He lived to see them finished, and to see the museum which, as the first conservator, he cherished for fifty years, transmitted to the care of his distinguished successor and son-in-law; he saw it enriched, enlarged, and worthily displayed and illustrated.

*Note L, to p. 29.*

It seems impertinent to compel the surgical reputations of Hunter and his most distinguished contemporaries to a competitive examination; yet something of this kind is necessary for a right understanding of his influence in surgery.

The four with whom he may best be compared are Cheselden, Samuel Sharp, Bromfeild, and Percivall Pott. If others did deserve comparison, they have left too few records for us now to judge of them.<sup>1</sup>

Cheselden was admirable as an anatomist, clear and artistic; and as an operator unrivalled in his time. His improvement of lithotomy was one of the greatest steps ever made in operative

<sup>1</sup> I have compared Hunter with only English surgeons; and for the purpose I have in view this may suffice. Neither French nor German surgeons affected surgery in the same manner as Hunter did. Some of them were excellent clinical surgeons, but with as little scientific spirit as their contemporaries in England.

surgery. In this part of surgery I believe that Hunter did not come near to equality with him; in all else he must have been equal or far superior. How much Hunter may have learned from Cheselden is quite uncertain; for when he became his pupil Cheselden had retired to Chelsea Hospital, and there are, I think, no records of the work done there.

Samuel Sharp, a pupil of Cheselden, whom William Hunter succeeded as a teacher of surgery, and from whom John Hunter may have learned by tradition and study of his books, must have been a thoroughly well-informed surgeon; well read, observant, judicious, a lover of simplicity, wisely doubtful. I think, too, that he must have been an eminently safe man, who might be relied on for knowing or doing whatever, in his time, could be known or done for the good of his patients. In this view I believe he was as good a surgeon as Hunter; but there is nothing in his books that can justly be called pathology; nor any sign of a really scientific method of study. They contain the 'practice' not the 'principles' of surgery;<sup>1</sup> but there is at least one sentence that deserves often quoting. He is discussing the utility of 'the bark' in the treatment of gangrene, and doubting (very rightly, as we now know) whether it deserved its then great reputation, and he says: 'Perhaps it may seem strange thus to dispute a doctrine established on what is called Matter of Fact, but I shall here observe that in the Practice of Physic and Surgery it is often exceedingly difficult to ascertain a Fact.'<sup>2</sup>

Bromfeild,<sup>3</sup> who was a colleague of Hunter's at St. George's, may well be compared with him. More than any other English surgeon of the time, except Hunter, he might be counted as a 'scientific surgeon;' for he was a good descriptive anatomist (he has even a piece of comparative anatomy),<sup>4</sup> and whenever he could he tried to make surgery fit into such physiology as was prevalent in the schools. But he writes of 'acid juices,'

<sup>1</sup> The chief of them are *A Critical Enquiry into the Present State of Surgery*, London, 8vo. 1750; and a *Treatise on the Operations of Surgery*, London, 8vo. 1751 (8th Edition).

<sup>2</sup> *Critical Enquiry*, pp. 255-6.

<sup>3</sup> In his *Chirurgical Observations and Cases*, London, 2 vols. 8vo. 1773.

<sup>4</sup> In vol. ii. p. 42.

'acicular particles;' and the like mere fancies of the physiologists of his time; and he thus makes Hunter appear immeasurably pre-eminent, not only in his knowledge of facts, but in his caution lest the study of surgery should be restrained or misled by doctrines in physiology. If anyone would see what progress Hunter gained for scientific surgery, let him compare his writings on Inflammation with those of Bromfeild. Even in practical surgery I cannot doubt that Hunter was the better of the two.

But I have as little doubt that Percivall Pott was the best practical surgeon of the time. I think it certain that he was the best in this country; I believe he was the best in Europe. This is implied, in several of the earlier Hunterian Orations, by those who knew him and had seen his practice, and it is clear in the study of his works. He scarcely treats of the principles of surgery; he has no physiology, little of what can fairly be called pathology; but his clinical teaching is admirable.<sup>1</sup> If we compare his writings and Hunter's on the subjects on which both wrote, as hernia, injuries of the head,—fractures, dislocations,—Pott not only is much clearer and fuller in description, giving evidence of larger reading and larger experience, but appears to have had a fuller view of the work to be done in diagnosis of different injuries and their several consequences. He shows also more knowledge of the course of events after injuries, and of what may be achieved by treatment. Moreover, the improvements which he made in practical surgery were equal in value to those which were directly due to Hunter. I say 'directly,' for the improvements which may be traced to Hunter's teaching are more than can now be told.

It is no wonder if, with all this skill, with fluency of speech and purity of style in writing, with a gentle temper and the manners of a well-educated gentleman, Pott was, to the end of his old age, the leader among the surgeons of his time in England. But this should not lower our estimate of Hunter's intellectual power. Rather we may marvel that he was so good a practical surgeon as to be for many years second to none but

<sup>1</sup> In the Library of St. Bartholomew's Hospital is a MS. of notes of Pott's Lectures, a course of thirty-five, which may be instructively compared with Hunter's.

Pott, and, after Pott's death, first among all of his time. The marvel is the greater, because in the early part of his career his surgical education was very deficient. His winters were spent in studying or teaching anatomy; it was only in the summers that, as an ordinary pupil, he could 'walk the Hospitals;' he was for one or two summers at Chelsea Hospital, where the practice among invalided soldiers must have been restricted; for one summer at St. Bartholomew's; he was House Surgeon at St. George's, after an uncertain time of study there, for only five months.<sup>1</sup> For the next five years, while he was teaching anatomy, there is no evidence of any regular study of surgery, though we may believe that he gathered knowledge of it when and as he could. In 1761, when he joined the army, he found and used opportunities enough, and still more when he became surgeon to St. George's in 1768. But, whatever his opportunities may have been, we may doubt whether so much as one-fourth of his time or mental power was given to practical surgery. His success, therefore, may be counted as among the surest evidences not only of enormous intellect, but of very rare and various practical ability, and of a singular versatility, such as his published works might not show.

It was happy for his influence on surgery that this was so; failure in practice would have cast discredit on his principles, however true they might have been, and would have deferred their adoption for at least one generation.

*Note M, to p. 29.*

I have often felt ashamed at not being able or willing to endeavour to enumerate the several discoveries we owe to Hunter. The difficulty is too great for me, because, to do such work fully and honestly, one should read not only all Hunter's works again, but those of his contemporaries, both at home and abroad. Anyone wishing to undertake the work may estimate its extent from Krüger's 'Synchronistische Tabellen zur Geschichte der Medicin' (Berlin 1840), and Haller's 'Bibliotheca Chirurgica.' The best summaries, but most of them needing revision during

<sup>1</sup> May to September 1756. Jesse Foot's *Life*, p. 75.



and after large study of the works of Hunter's contemporaries and predecessors, may be found in Ottley's 'Life of Hunter;' Abernethy's 'Introductory Lectures,' 1814-15, Ed. 1823, p. 75; Arnott's 'Hunterian Oration,' 1843; Owen in 'Hunter's Works,' vol. iv., and 'Essays and Observations,' vols. i. and ii.; Buckle's 'History of Civilisation in England,' vol. ii. 1861.

*Note N, to p. 33.*

Assalini does not clearly tell what became of the aneurism in Spezzani's case.<sup>1</sup> The leg was threatened with gangrene, and he says that after the ligature of the femoral, 'vide con somma sua sorpresa e con soddisfazione degli astanti ravnivarsi le parti, detergersi l'ulceri, e la gamba;' and again, speaking of Spezzani's operation, 'ma fu a caso nè seppe tirar partito del successo inaspettato della sua operazione.' To speak of success may imply that the aneurism was cured, but I have not been able to find any works of Spezzani; and it is strange that Scarpa does not mention the case in any of his works on aneurisms, even though he quotes the very part of Assalini's Manual in which it is contained, and often speaks of 'the Hunterian Operation.'

In endeavouring to trace the process by which Hunter arrived at the invention of his operation for aneurism, it appears that for many years before the invention he had defended the older operation against the almost universal objections to it. Pott and Bromfeild especially were opposed to the use of the ligature, whether for aneurism or for large arteries wounded in their course. They preferred amputation, and this preference appears to have been generally entertained both in England and abroad. Hunter found himself so unsupported in his defence of the ligature for aneurism that, in a letter some years before his invention of his own operation, he speaks of the older method, that of laying-open the sac and tying the artery above and below, as his own—'my operation,' he calls it.

His arguments in favour of the ligature after this older method may be found in his lectures.<sup>2</sup> The chief objection

<sup>1</sup> *Manuale di Chirurgia*, Part I. pp. 87, 130.    <sup>2</sup> *Works*, vol. i. p. 543.

raised was, that the circulation could not be carried on by anastomosing vessels.<sup>1</sup> Hunter knew that it could be ; he had seen in a patient with aneurism both the femoral and the profunda obliterated, and yet the limb supplied with blood ;<sup>2</sup> and he had often, in injected limbs, dissected the anastomosing branches connecting the upper and the lower parts of the arterial trunk. Thus he says : ' I believe we should not be anxious about the collateral branches ; I have lost several advantages from this mistaken delicacy. I believe the circulation will always go on after the femoral artery is secured by ligature.'<sup>3</sup>

So he stuck to his beliefs and to the older operation for aneurism from 1773, or earlier, to 1785, though I cannot find that he had a single successful case. Home says that he ' repeatedly performed the operation,' and speaks of his ' finding that it in general fails ;' ' and Hunter himself tells of only two successes, and neither of these was his own.

His failures, well studied, showed him the way to final great success. He saw that the failure was often due to the popliteal artery being diseased above the sac and ulcerating under the ligature. ' The accident of the artery giving way happened several times to him.'<sup>4</sup> And when, for the secondary hemorrhage thus ensuing, he tried to tie the artery higher up in the popliteal space, he found great difficulty, and still greater if he tried to ' follow it up through the insertion of the triceps muscle.'

Every failure of this kind suggested the tying of the artery ' up higher in the sound parts.' But many objections to this were urged. To some of them it could be answered that at least the progress of the disease would be stayed if the sac were relieved from the force of the circulating blood ; but then it was objected that the whole arterial system might be and

<sup>1</sup> See especially Bromfeild, *Chirurgical Observations and Cases*, vol. i. p. 205, 1773 ; and Hunter's *Lectures*, in *Works*, vol. i. p. 547.

<sup>2</sup> Home in *London Medical Journal*, vol. vii. p. 400.

<sup>3</sup> *Lectures*, in *Works*, vol. i. pp. 550-1.

<sup>4</sup> Account of Mr. Hunter's Method, in *Hunter's Works*, vol. iii. p. 594. The first operation is uncivilly criticised by Bromfeild in his *Observations*, 1773.

<sup>5</sup> Home, in *London Medical Journal*, vol. vii. p. 393, 1786.

generally was diseased, and that the ligature higher up would therefore fail. To which Hunter answered (whether to himself or to others) that, as he had found in examinations after death, the whole arterial system was not in general diseased; if it were, how could amputation for aneurism escape being fatal? But, as amputation did sometimes save life, 'why not tie' the artery 'up higher in the sound parts where it is tied in amputation, and preserve the limb?'<sup>1</sup>

But, again, it was objected that the aneurism and its contents could not safely be left. To which Hunter could answer that they would be absorbed; for the absorption of bone and other solid parts was clear matter-of-fact, and the limits of the power of absorption were far from being known.

Such, I believe, were the facts and arguments on which Hunter decided, first, that it was better to tie arteries than to amputate for aneurisms, and then that the arteries ought to be tied far above the aneurisms and in healthy parts. And the reason why he decided right, and others wrong, seems to be that he observed and thought more constantly and carefully than they did; his thoughtful scientific mind had a better power both of observing facts and of estimating their value; he had learned better how to trust them; he had more faith in them. The facts themselves were, as I have said, facts of the wards and the dead-house, known, or easily learned, by all surgeons; but the scientific mind could weigh them, and dare to act on them, better than the merely practical mind could.

But in the whole story of the invention nothing is more remarkable than Hunter's caution. It is enough to prove not only his singular prudence, but the great difficulty he had in planning his operation and deciding that it could be safely undertaken. His Lecture on Aneurisms may be studied as a model of cautious thinking. And even after he had invented his operation he went on so cautiously, that we may think he had groundless fears. First he used four ligatures, each one less tight than the one below it, because, Assalini says, 'the blood dashed with such force against the [first] ligature that there was danger of rupture.'<sup>2</sup> Then, for no apparent reason,

<sup>1</sup> *Lectures*, p. 548.

<sup>2</sup> *Manuale*, p. 86.

he tied both artery and vein, and then settled on the plan which admitted of only one considerable improvement, that, namely, by Scarpa, who first tied the artery in the triangular space since called by his name.

The Hunterian operation has had consequences of inestimable value. It encouraged and justified all the means of cure of aneurisms by compression of the main artery. It was the beginning of the study of the most important section of the 'surgery of arteries,' the most intensely interesting department of all surgery. It introduced a method of operating in which all the best qualities of the surgeon find their best exercise. All these good things may be ascribed to Hunter's careful study and his reliance upon facts.

He showed the same mind in his practice of transplanting teeth; but here, though the scientific principle was right, the practical difficulties were too great for the art. Hunter had made many transplantations from one part or one animal to another; and, as a climax, he had succeeded in transplanting a human tooth into a cock's comb, in which it held firm and acquired union by blood-vessels. He could be sure then that teeth had 'the vital principle;'<sup>1</sup> therefore good teeth taken from one person's mouth might be transplanted into the sockets out of which bad teeth had just been taken from another's mouth. And, as a scientific fact, this was so sure, and so interesting, that Hunter was a long time before he could or would see that there were often insuperable practical difficulties in finding teeth with exactly similar fangs, and givers and takers in good health, and that the buying and selling part of the practice was cruel and disgusting. The whole story of the practice as told in his work on the Teeth,<sup>2</sup> and his very fair comments on it,<sup>3</sup> are instructive illustrations of his scientific faith in facts and of his matchless perseverance.

<sup>1</sup> The MS. of the *Treatise on the Teeth*, in the College-Library, has the passage on the vital principle in the teeth as an addition in Hunter's handwriting, as if it were an afterthought, or as if he would correct the error that might arise from speaking of them as extraneous to the circulation.

<sup>2</sup> *Works*, vol. ii. p. 55, *e. s.*

<sup>3</sup> *Ibid.* p. 473.

*Note O, to p. 35.*

I have found mention of only three whose expressions concerning Hunter indicated great personal regard: Jenner, Wm. Bell, and Clift.

Jenner lived with him as a pupil for two years, and Hunter's letters in Ottley's 'Life' show that they remained in the most friendly intimacy. Dr. Baron says:<sup>1</sup> 'It was a truly interesting thing to hear Dr. Jenner, in the evening of his days, descanting, with all the fervour of youthful friendship and attachment, on the commanding and engaging peculiarities of Mr. Hunter's mind. He generally called him the "dear man," and . . . described the honesty and warmth of his heart.' William Bell lived with Hunter for fourteen years as artist, amanuensis, curator; and Clift tells of him, 'he absolutely idolised Mr. Hunter.'<sup>2</sup>

Clift, of whose work in copying the manuscripts I have already spoken (p. 51), lived with Hunter in the last eighteen months of his life, and had not only profound respect, but an affectionate regard for him, and served him with a very rare devotion. He was always jealous of Hunter's honour, and denied or palliated everything that could be told against him. He often assured me that the stories about Hunter's being coarse and vulgar were untrue, or at least grossly exaggerated.

Among Hunter's other pupils none but Sir Everard Home and Mr. Abernethy appears to have been intimate with him, and it is chiefly from their writings that I have drawn my sketch of his personal character. Some notes may be added to it. Abernethy, who of all his pupils was best able to appreciate him and his works, calls him 'a shrewd man, aye and a benevolent man too;' and says, 'he had a great deal of drollery in his composition.' He speaks also of 'the zeal with which he assisted every poor man of merit,' of his candour and patience, and says he was 'humble-minded,' and 'a man of very considerable humour.'<sup>3</sup>

<sup>1</sup> *Life of Edward Jenner*, vol. i. p. 124.

<sup>2</sup> See letter in the Notes to Lawrence's *Hunterian Oration*, 1846, p. 61. It may be read, also, for the correction of very probable errors in Ottley's *Life*.

<sup>3</sup> *Hunterian Oration*, 1819.

In their Hunterian Orations Sir Anthony Carlisle<sup>1</sup> speaks of his 'moral pride, his honour, and his justice;' Mr. Chevalier<sup>2</sup> of his 'philanthropy, public spirit, and liberality in science;' Mr. Norris<sup>3</sup> calls him 'kind-hearted, generous, and amiable.'

Abernethy gives stories of his quick, vehement temper and violence of language; and Ottley's 'Life' contains so many, that though Abernethy and Clift might palliate them, and though they are all of that class of stories whose strength increases with age and repetition, yet it cannot be doubted that Hunter was very hasty, passionate, and sometimes unbridled in his speech. But of his gentler emotions, of which Home speaks,<sup>4</sup> he himself incidentally gives instances: 'The mind is often in opposition to itself. . . . I went to see Mrs. Siddons's acting. I had a full conviction that I should be very much affected; but, unfortunately, I had not put a handkerchief in my pocket; and the distress I was in for the want of that requisite when one is a crying, and a kind of fear I should cry, stopped up every tear, and I was even ashamed I did not, nor could not cry.'<sup>5</sup> And 'When I had the spasm in my heart upon the smallest exertion of the body, as in walking up a small ascent, or upon the least anxiety about an event, such as bees swarming, yet I could tell a story that called up the finer feelings, which I could not tell without crying, obliging me to stop several times in the narration; yet the spasm did not in the least take place.'<sup>6</sup>

There are many evidences of Hunter's sensitiveness about his reputation in science,<sup>7</sup> and he sometimes wrote angrily as if a small loss would have ruined it; yet I think that in this respect, and generally in his controversies, he was less sensitive and less bitter than was customary in his time. And certainly in vehemence and love of controversy he fell short of his brother, who says: 'It is remarkable that there is scarce a considerable character in anatomy that is not connected with some warm controversy. Anatomists have ever been engaged in contention.

<sup>1</sup> *Oration*, 1820.

<sup>2</sup> *Oration*, 1821.

<sup>3</sup> *Oration*, 1825.

<sup>4</sup> *Life*, p. lvi.

<sup>5</sup> *Essays and Observations*, vol. i. p. 257.

<sup>6</sup> *Ibid.* p. 266.

<sup>7</sup> As in his *Lectures*, in *Works*, vol. i. pp. 208-210, and *Works*, vol. iii. p. 2.

And indeed, if a man has not such a degree of enthusiasm and love of the art as will make him impatient of unreasonable opposition, and of encroachments upon his discoveries and his reputation, he will hardly become considerable in anatomy or any other branch of natural knowledge.<sup>1</sup>

William Hunter acted on these principles all his life. John did not; and on many occasions must have exercised great self-restraint. His treatise on the Venereal Disease was, by several writers, vehemently attacked,<sup>2</sup> but I think he left them all unanswered.

One cannot doubt that Hunter was a very good-hearted man, but, whether for want of time or want of care, he did not make friends. He was uncouth, vehement, unready to conform to the customs of his profession, and in this sense at least unsociable, and therefore unpopular. Still, it cannot fairly be said (as it commonly is of great men) that during his lifetime he was ill-used or regarded with dislike or disrespect.

It is easy to find opposition of statements concerning him. Jenner, in the grand style which he sometimes assumed, says:<sup>3</sup> ‘And as for fame, what is it? a gilded butt for ever pierced with the arrows of malignancy. The name of John Hunter stamps this observation with the signature of truth.’ But others tell that, at least in the later years of his life, he was accounted the first among anatomists and surgeons.

Doubtless, the greatness of Hunter’s work was not clearly discerned by his contemporaries. Much of it was too far above the level of knowledge at the time, and he went far in the study of subjects which others had hardly begun to think of. Still it cannot, with any justice, be said that he was distrusted or made light of.

Among the public, I believe that he was regarded by many as a very strange man, and his love of collecting was thought a useless eccentricity. There were not a few of his habits which may explain these thoughts of him. Most people would even

<sup>1</sup> Quoted in Simmons’s *Life*, p. 25.

<sup>2</sup> By Clutterbuck, Duncan, Gordon, and others, in pamphlets published at the time.

<sup>3</sup> In the *Life*, by Dr. Baron, vol. i. p. 155.

now regard a scientific man as very strange, who at his house close by London should keep wild beasts and have a lions' cave, and should have the front of his house adorned with sculptured lions, small pyramids of shells, and a crocodile's head with gaping mouth, and should ever drive into London with a pair of buffaloes in harness.

But he was generally known and admired as a great naturalist; as 'that ingenious gentleman' or 'that celebrated anatomist,' to whom all manner of strange things were sent. And this reputation was enhanced when, after 1785, he opened his museum 'to noblemen and gentlemen in town during the spring.'<sup>1</sup>

Among men of science he had great weight. He was elected into the Royal Society even before his brother, had the Copley medal, was intimate with all the leaders of his time, and was referred to on all questions of comparative anatomy and natural history. And yet as one looks through the works of his contemporaries one may be amazed at their having known so little of the grandeur or even of the mere size and design of his work. The general ignorance may be judged of from a single instance. Sir Joseph Banks, the President of the Royal Society, the leader in science, and an intimate friend of Hunter, wrote in 1796: 'Had I thought my friend John Hunter's collection an object of importance to the general study of natural history, or indeed to any branch of science except to that of medicine, I hope that two years would not have elapsed without my having taken an active part in recommending to the public the measure of purchasing it. I was consulted in the first instance by the gentlemen concerned, who, if I rightly understood them, agreed with me in thinking that the history of diseases was the only interesting and valuable part, and the natural history was not of consequence sufficient to be brought forward as an object of public purchase.'<sup>2</sup> . . .

When Sir Joseph Banks could thus write of a Museum of Comparative Anatomy and Physiology, and of Geology, with which no other at that time extant could be compared, it is not

<sup>1</sup> Norris, *Hunterian Oration*, 1825, p. 31.

<sup>2</sup> Letter to Lord Auckland, in Ottery's *Life of Hunter*, p. 141.



strange that Hunter's work in these sciences is very rarely mentioned in any periodical or other works published in this country during his life, or in the twenty years after his death. He is rarely referred to as if he had done more than observe a few facts in comparative anatomy. Abroad, even less was known about his work. Abernethy says:<sup>1</sup> 'Even Professor Cuvier has declared he knew not that there was such a collection as the Hunterian Museum.' Still, there is no sign that Hunter's highest science was treated with anything worse than the neglect of ignorance, and with not a few the ignorance which was negligent in practice was vehement in talking praise; for that which most provoked the rage of Jesse Foot was, that there were so many who, at the later part of Hunter's life, talked of him as 'the first anatomist and the first surgeon in the world.'<sup>2</sup>

I think that as a surgeon Hunter was justly estimated. He was elected to good appointments (see p. 38) long before he published anything considerable in surgery. In private, like most of those who have been successful, he at first slowly and then more quickly rose in favour; he had a large practice for about ten years, and the largest in London for five or six. 'In his riper years,' it is said by one of his pupils, he was 'appealed to equally by physicians and surgeons as the final judge upon all unsettled questions in Pathology,' and, 'as a final referee among his brethren, no one surpassed him in candour and good faith.'<sup>3</sup>

He was in the fullest practice when he died, and if he had lived might have earned a large income for five or six years more: but, for all that, he would have died poor; for he was a free-handed man,<sup>4</sup> careless about money, and nothing would have changed the noble recklessness with which he pursued knowledge and the means of teaching it.

After having studied Hunter's life, and all his defects of temper and of general culture, of social skill and of all the arts of pleasing, nothing has seemed clearer than that the power

<sup>1</sup> *Physiological Lectures*, 1833, p. 5.

<sup>2</sup> In his *Life of John Hunter*, p. 11, &c.

<sup>3</sup> Sir A. Carlisle, *Hunterian Oration*, 1820, p. 47.

<sup>4</sup> *Life*, by Ottley pp. 120 1, and by Home, p. lxvii.

of a great intellect, with a strong will and a right aim, is in the competition of life sufficient and irresistible; and that among all the intellects and wills that I have studied not one was stronger than John Hunter's.



*By the same Author.*

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